Non-surgical treatment of periapical lesion using calcium hydroxide- A case report

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Abstract

This article presents non-surgical resolution of an extensive periapical lesion because of trauma to maxillary right central incisor. Clinical examination revealed intraoral swelling in relation to maxillary right central incisor and radiographically, radiolucency was seen with both maxillary right central and lateral incisor about 7mm in diameter. Pus was drained through the canal orifice.

After thorough biomechanical preparation, an intra-canal calcium hydroxide dressing was applied and periodically reviewed for 9 months. Significant bone formation was seen at the periapical region at periodic check up visits. Complete radiologic healing of the periapical lesion was observed one year after root canal filling. Thus the non surgical healing of the multiple periapical lesions provided favorable clinical and radiographic response.

KEYWORDS: Periapical lesion, nonsurgical, endodontic therapy, Calcium Hydroxide

Introduction

Periapical lesions develop as sequelae to pulp disease. Bacterial infection of the dental pulp may lead to periapical lesions[1]. They are generally diagnosed either during dental radiographic examination or following acute pain in tooth[2].Most periapical lesions can be classified as dental granulomas, radicular cysts or abscesses[3,4]. The incidence of cysts within periapical lesions varies between 6 and 55%[5]. The occurrence of periapical granulomas ranges between 9.3 % and 87.1%, and of abscesses between 28.7% and 70.07%[6]. There is clinical evidence that as the periapical lesions increase in size, the proportion of the radicular cysts increases. However, some large lesions have been shown to be granulomas [7].

The ultimate goal of endodontic therapy should be to return the involved teeth to a state of health and function without surgical intervention[8].All inflammatory periapical lesions should be initially treated with conservative nonsurgical procedures[9]. Surgical intervention is recommended only after nonsurgical techniques have failed[10].Besides, surgery has many drawbacks, which limit its use in the management of periapical lesions[11,12]. Various studies have reported a success rate of up to 85% after endodontic treatment of teeth with periapical lesions[13,14].A high percentage of 94.4% of complete and partial healing of periapical lesions following nonsurgical endodontic therapy has also been reported[15].

The following factors must be considered, while deciding on the management approach:

1] Diagnosis of the lesion

2] Proximity of the periapical lesion to adjacent vital teeth

3] Encroachment on anatomical structures

4] Patient cooperation

5] Age of the patient

6] Obstructions in the root canal system

7] Time involved for treatment

Case Report:

A patient, 10 year old reported to the Department of Pediatric and Preventive Dentistry with a chief complaint of pain and swelling in maxillary anterior region. There was a history of trauma to maxillary right central incisor 1 year back due to fall while playing. But the patient did not seek any treatment for the same at that time.

Extraoral examination revealed no swelling. Intraoral examination revealed fracture of maxillary right central incisor involving enamel and dentin. Two periapical radiographs at different vertical angulations were made but showed no root fracture. Periapical radiographic examination revealed a ill defined radiolucent area involving maxillary right central and lateral incisors, measuring around 7mm in diameter, calcification in the coronal part of pulp of maxillary left central incisor was seen however there was no periapical radiolucency with this tooth **(Fig 1).**

Cold sensitivity test using cold spray 50°C (Endo-Frost Coltene Whaledent[R]) containing Propene/Butane was done which was negative for the involved teeth and delayed response with maxillary left central incisor. The clinical and radiographic findings were suggestive of periapical pathology of in relation to 11 and 12. Hence endodontic treatment was proposed with patient's consent.

At first visit the local anesthesia and rubber dam was set in place and endodontic access was performed with 11, 12 and 21 using air rotor hand piece with water coolant. The exudates from the canals of right maxillary central and lateral incisor were drained. The contents of the infected root canal were neutralized using Kerr-files, under irrigation with 5.25% of sodium hypochlorite solution diluted with normal saline. Subsequent cleaning and shaping was done using step back method and using copious irrigation with 5.25% sodium hypochlorite. After drying calcium hydroxide powder [PREVEST DENPRO LIMITED 38,Industrial Estate, Digiana,Jammu] mixed with normal saline was placed in root canals of 11, 12 using lentulo spiral.

At 3 month visit the cold vitality test with 21 was negative and there was a periapical radiolucency associated with it hence enododontic treatment was initiated and calcium hydroxide was placed in the canal.11 and 21 were asymptomatic at this visit and showed periapical healing on IOPA **(Fig 2**). At the 6 month visit the periapical radiolucency reduced considerably with 11, 12 and 21**(Fig 3).**

At 9 month visit the periapical radiolucency reduced completely and root canal obturation was done using zinc oxide eugenol sealer(DENTOCARE PVT. LIMITED) and Gutta percha (Dentsply MAILLEFER) using cold lateral condensation technique, followed by permanent restoration with composite (PRIME DENT [R)] (**Fig.4 & Fig 5).** After one year follow up period, the patient was asymptomatic and there was no sign of periapical pathology.

DISCUSSION

The perfect mechanism involved in formation of periapical lesions is not fully understood. It is considered that if the pulp becomes necrotic the environment around the periapical area become suitable to allow microorganisms to multiply and various toxins enter into the periapical tissue initiating inflammatory reaction which leads to formation of periapical lesions[17,18].

Radiographically in the present case the mean diameter of the lesion was around 7mm.However surgical treatment of all periapical pathologies is not often necessary since they may respond satisfactorily to the adequate endodontic treatment. A nonsurgical approach should always be adopted before resorting to surgery. When there is no drainage of fluid from the canals, calcium hydroxide or the triple antibiotic paste can prove beneficial. Periodic follow-up examinations are essential and various assessment tools can be used to monitor the healing of periapical lesions[5].

Calcium hydroxide nowadays is a widely used endodontic material, thanks to its high alkalinity (Tronstad et al. 1981)[19] and bactericidal effect (Sjogren et al. 1991, Siqueira & Lopes 1999)[20,21]. In the presence of large and chronic periapical lesions, the deliberate placement of calcium hydroxide beyond the confines of the root canal and into the peri-radicular tissues has been advocated. Some speculate that it would have a direct effect on inflamed tissue and epithelial cystic linings and in this manner would favour periapical healing and encourage osseous repair (Tronstad et al. 1981).

In the present case we see a extensive periapical lesion associated with trauma of maxillary right central incisor The clinical examination revealed that after thorough biomechanical preparation, a calcium hydroxide root canal dressing was applied and periodically observed for a period of 9 months.

Fig 1: IOPA showing periapical lesion with 11, 12

Fig 2: 3 months postoperative IOPA showing reduction in periapical lesion with 11, 12

Fig 3 : 6 months postoperative IOPA showing further reduction in periapical lesion with 11, 12

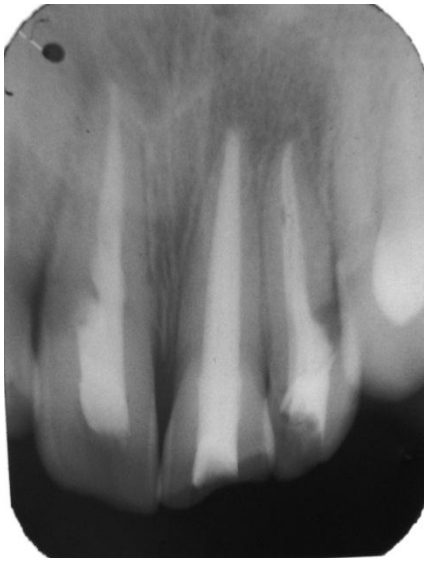

Fig 4: 9 months postoperative IOPA showing complete healing of periapical lesion and obturation with 11, 12 and 21

Fig 5. Post operative intra oral photograph

Significant bone formation was seen at the periapical region on periodic check up visits. Complete radiographic healing of the periapical lesion was observed one year after root canal filling. Thus the non surgical healing of the multiple periapical lesions provided favourable clinical and radiographic response. It has been demonstrated that treatment with calcium hydroxide as an interim dressing in the presence of large and chronic periapical lesions can create an environment more favourable to healing and encourage osseous repair (Cvek 1972, Heithersay 1975, Sahli 1988)[22,23,24].

The periapical lesions in the present case was to large but, it was resolved after nonsurgical therapy.Periapical tissues have rich blood supply, lymphatic drainage and abundant undifferentiated mesenchymal cells and therefore good potential for healing[25]. Thus the treatment should be directed in removing the causative factors.

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